SLOVENSKI STANDARD
SIST EN 13053:2020

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Prezračevanje stavb - Klimatske naprave - Ocenjevanje in lastnosti naprav, sestavnih delov in sekcij/sklopov

Ventilation for buildings - Air handling units - Rating and performance for units, components and sections

Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte - Leistungskenndaten für Geräte, Komponenten und Baueinheiten

Ventilation des bâtiments - Caissons de traitement d'air - Classification et performance des unités, composants et sections

Ta slovenski standard je istoveten z: **EN 13053:2019**

ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

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EUROPEAN STANDARD

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English Version

Ventilation for buildings - Air handling units - Rating and performance for units, components and sections

Ventilation des bâtiments - Centrales de traitement d'air - Classification et performance des unités, composants et sections

Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte - Leistungskenndaten für Geräte, Komponenten und Baueinheiten

This European Standard was approved by CEN on 28 September 2018.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 13053:2019) has been prepared by Technical Committee CEN/TC 156 "Ventilation for buildings", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2020, and conflicting national standards shall be withdrawn at the latest by June 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13053:2006+A1:2011.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

This document has been revised and includes new requirements according to Ecodesign requirements for ventilation units given in EU Commission Regulation No 1253/2014.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a part of a suite of standards for air handling units used for ventilation and air conditioning of buildings for human occupancy. It considers the ratings and the performance of air handling units as a whole, the requirements and performance of specific components and sections of air handling units including hygiene requirements. The position of this standard in the field of mechanical building services is shown in Figure 1.

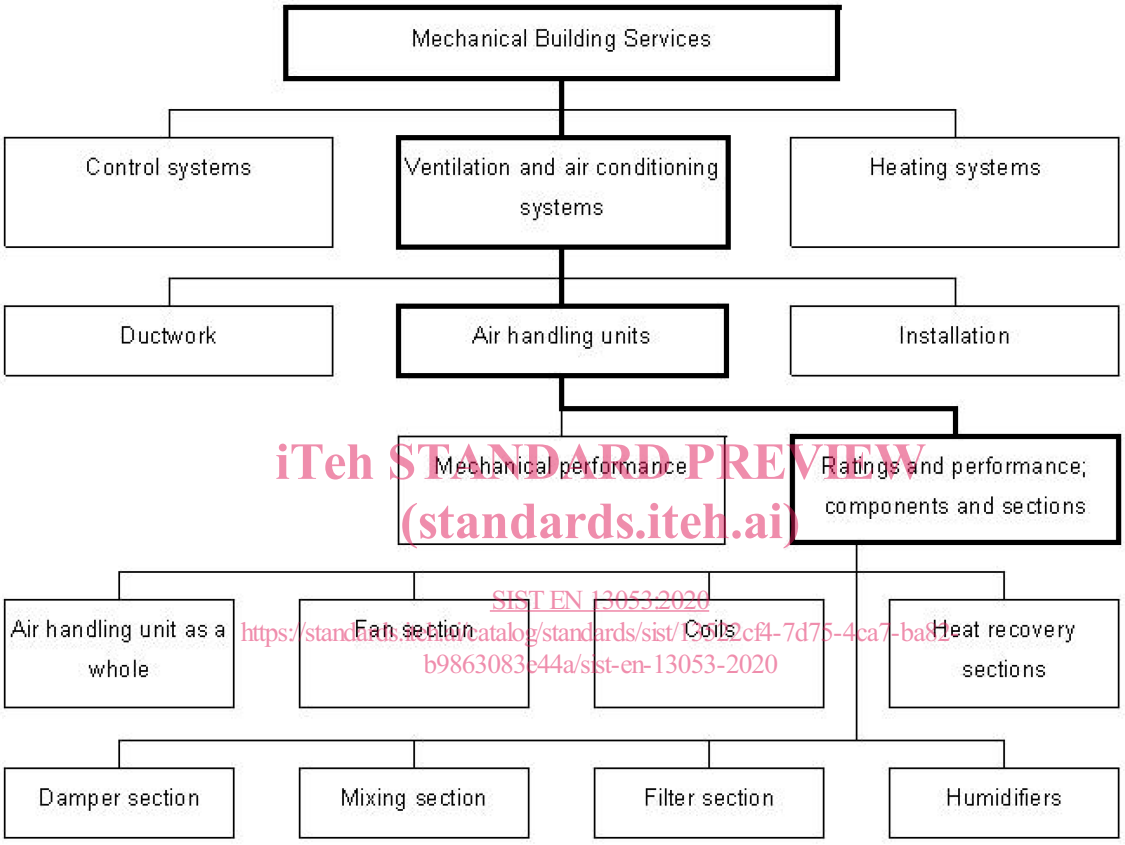

Figure 1 — Position of this standard in the field of mechanical building services

1 Scope

This document specifies requirements and testing for rating and performance of Non Residential Ventilation Units, NRVU's, specifically Air Handling Units (AHU's). It specifies requirements, classifications and testing of components and sections of air handling units.

This document applies to tests in a laboratory and *in situ*. This document is applicable both for mass produced air handling units and tailor-made Air Handling Units.

This document applies to AHU and individual sections of AHU with the designed air flow > 250 $m^3 \cdot h^{-1}$. This document applies to UVU's with additional air treatment components in addition to filtration.

This standard does not include:

— residential unidirectional and bidirectional ventilation units;

— nonresidential unidirectional ventilation units which consist of only a casing, a fan with or without filter.

NOTE 1 Residential ventilation units are covered by EN 13142.

NOTE 2 Nonresidential unidirectional ventilation units which consists only casing, fan with or without filter are covered by EN 17291.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 308, *Heat exchangers — Test procedures for establishing performance of air to air and flue gases heat recovery devices*

EN 1216, *Heat exchangers — Forced circulation air-cooling and air-heating coils — Test procedures for establishing the performance*

EN 1751, *Ventilation for buildings — Air terminal devices — Aerodynamic testing of damper and valves*

EN 1886, *Ventilation for buildings — Air handling units — Mechanical performance*

EN 12599:2012, *Ventilation for buildings — Test procedures and measurement methods to hand over air conditioning and ventilation systems*

EN 12792:2003, *Ventilation for buildings — Symbols, terminology and graphical symbols*

EN 16211, *Ventilation for buildings. Measurement of air flows on site. Methods*

EN ISO 3741, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for reverberation test rooms (ISO 3741)*

EN ISO 3743-1, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room (ISO 3743-1)*

EN ISO 3744, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744)*

EN ISO 3746, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746)*

EN ISO 5136, *Acoustics — Determination of sound power radiated into a duct by fans and other air-moving devices — In-duct method (ISO 5136)*

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements (ISO 5167-1)*

EN ISO 5801, *Industrial fans — Performance testing using standardized airways (ISO 5801)*

EN ISO 7235, *Acoustics — Laboratory measurement procedures for ducted silencers and airterminal units — Insertion loss, flow noise and total pressure loss (ISO 7235)*

EN ISO 9614-1, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points (ISO 9614-1)*

EN ISO 9614-2, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning (ISO 9614-2)*

EN ISO 9614-3, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 3: Precision method for measurement by scanning (ISO 9614-3)*

EN ISO 16890-1, *Air filters for general ventilation — Part 1: Technical specifications, requirements and classification system based upon particulate matter efficiency (ePM) (ISO 16890-1)*

EN ISO 16890-2, *Air filters for general ventilation — Part 2: Measurement of fractional efficiency and air flow resistance (ISO 16890-2)*

EN ISO 16890-3, *Air filters for general ventilation — Part 3: Determination of the gravimetric efficiency and the air flow resistance versus the mass of test dust captured (ISO 16890-3)*

EN ISO 16890-4, *Air filters for general ventilation — Part 4: Conditioning method to determine the minimum fractional test efficiency (ISO 16890-4)*

ISO 3966, *Measurement of fluid flow in closed conduits — Velocity area method using Pitot static tubes*

ISO 13347-1, *Industrial fans — Determination of fan sound power levels under standardized laboratory conditions - Part 1: General overview*

ISO 13347-2, *Industrial fans — Determination of fan sound power levels under standardized laboratory conditions - Part 2: Reverberant room method*

ISO 13347-3, *Industrial fans — Determination of fan sound power levels under standardized laboratory conditions - Part 3: Enveloping surface methods*

ISO 13347-4, *Industrial fans — Determination of fan sound power levels under standardized laboratory conditions - Part 4: Sound intensity method*

ISO 16956, *Thermal performance in the built environment — Determination of air flow rate in building applications by field measuring methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792:2003 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
air handling unit
factory made unit encased assembly containing a fan or fans, filtrating device(s) and other necessary equipment to perform at least one or more of the following functions: heating, cooling, heat recovery, heat transfer, humidifying, dehumidifying and mixing air

3.2
section
< air handling unit > functional element of an air handling unit consisting of one or more components in a single casing

3.3
component
< air handling unit > smallest functional element of an air handling unit

3.4
casing
< air handling unit > enclosure of the unit, within which the components are mounted

3.5
damper section
section of air handling unit including a damper or valve

3.6
mixing section
section where e.g. outdoor air flow and the recirculation air flow are mixed in a controlled way

Note 1 to entry: The section generally consists of one damper per air flow and a mixing chamber

3.7
filter section
section including a filter or filters and an associated filterframe

3.8
heat recovery section
section in which heat (and possibly also moisture) is transferred from one airstream into another, either directly or using an intermediary heat transfer medium

3.9
heating and cooling coils
heat exchangers by means of which heat is transferred from a heat transfer medium to air (heating coil) or the other way round (cooling coil)

3.10
sound attenuation section
section in which sound transfer into a ductwork or into ambient air is reduced

3.11
humidifier section
section in which moisture is added to the air

3.12
fan section
section in which one or more fans are installed for moving air

3.13
functions

3.13.1
air treatment
process by which the state of the air is modified with respect to one or more of its characteristics such as temperature, moisture content, dust content, bacterial count, gas and vapour content

3.13.2
cooling
removal of latent and/or sensible heat

3.13.3
dehumidification
controlled reduction of water vapour from the air

3.13.4
filtration
removal of particulate material from the airstream

3.13.5
heating
transfer of heat from one body or medium to another medium

3.13.6
humidification
controlled addition of water vapour to an air stream or space

3.13.7
sound attenuation
controlled reduction of sound energy

3.14
characteristics

3.14.1
air flow
movement of air within set boundaries (such as ducts)

3.14.2
air flow rate
volume flow of air passing a given plane divided by time

3.14.3
bypass leakage
unwanted and uncontrolled passing of untreated air into the treated air between the components within a casing, such as filters and coils

3.14.4
defrosting heat factor
ratio between the energy transferred into the air supply and the maximum recoverable energy in exhaust air, excluding the energy input for defrosting

3.14.5
unit pressure, p_u
difference between the total pressure at the outlet of the air handling unit and the total pressure at the inlet

3.14.6
unit static pressure p_{us}
difference between the static pressure at the outlet of the air handling unit and the total pressure at the inlet

3.14.7
external static pressure difference, $\Delta p_{s,ext}$
difference between the static pressure at the outlet of the air handling unit and the static pressure at the inlet

3.14.8
humidification efficiency
ratio between the mass of water evaporated by the humidifier and the theoretical mass needed to achieve saturation at a given temperature

3.15
mass produced air handling unit
air handling units manufactured to the same design and by the same manufacturing process, with a range of performance characteristics for which the duty point is not defined

Note 1 to entry: Mass produced air handling units (AHUs) are designed for an undefined duty point and mostly produced in large quantities. Their capacity is generally given in ranges so that they can be used in different buildings and/or applications.

3.16
tailor made air handling unit
air handling unit individually designed and manufactured for a specific duty point, with defined and known parameters, designed on a specific order and for a specific purpose

3.17
nominal external pressure
declared design external static pressure difference at nominal air flow

3.18
internal pressure difference of ventilation components, $\Delta p_{s,int}$
sum of the static pressure differences of a reference configuration of a BVU or an UVU at nominal air flow

3.19
internal pressure difference of additional non-ventilation components, $\Delta p_{s,add}$
remainder of the sum of all internal static pressure differences at nominal air flow after subtraction of the internal pressure difference of ventilation components (Δps,int)

3.20
internal specific fan power of ventilation components SFP_{int}
ratio between the internal pressure difference of ventilation components and the fan efficiency, determined for the reference configuration

3.21
nominal duty point
point at declared design flow rate of an air handling unit at standard air conditions and at declared external pressure which is used to assess SFP_{int} and thermal efficiency

3.22
nominal air flow
declared flow rate at the nominal duty point

3.23
reference configuration of a NRVU-BVU
product configured with a casing, at least two fans with variable speed or multi-speed drives, a HRS, a clean fine filter (minimum ISO ePM1 50%) on the supply air side and a clean medium filter (minimum ISO ePM10 50%) on the exhaust air side

3.24
reference configuration of a NRVU-UVU supply air
product configured with a casing and at least one fan with variable speed or multi-speed drive, and in case the product is intended to be equipped with a filter, this filter shall be a clean fine filter (minimum ISO ePM1 50%)

3.25
reference configuration of a NRVU-UVU exhaust air
product configured with a casing and at least one fan with variable speed or multi-speed drive, and in case the product is equipped with a filter, no filter class is specified

4 Symbols and abbreviations

For the purposes of this standard, symbols and units given in EN 12792:2003 and in Table 1 apply together with those defined by the formulas, text and annexes of this standard.

Table 1 — Symbols, terms, units and subscripts

Symbol	Term	Unit
c	Sound velocity in the air	$m \cdot s^{-1}$
E	Duct end correction value	dB
f	Frequency	Hz
h	Enthalpy	
n	Number of measurements within the total measuring time	-
L_p	Sound pressure level	dB
L_W	Sound power level	dB
L_{WA}	A-weighted sound power level	dB(A)
n_{fan}	Rotational speed of the fan	s^{-1}
P_{el}	Electrical motor input power, including any speed control	W
$P_{el,aux}$	Auxiliary electric power input (e.g. pumps)	W
$P_{el,int}$	Electrical power consumption due to internal pressure differences of ventilation components	W
Pm_{ref}	Reference power input	W
p_a	Atmospheric pressure	Pa
p_d	Dynamic pressure	Pa
p_s	Static pressure	Pa
p_t	Total pressure	Pa
p_u	Unit pressure	Pa
p_{us}	Unit static pressure	Pa
q_d	Mass flow of water drain and overflow	$kg \cdot s^{-1}$
q_m	Air mass flow rate	$kg \cdot s^{-1}$
q_v	Air volume flow rate	$m^3 \cdot s^{-1}$
q_{vm}	Measured and converted air volume flow rate	$m^3 \cdot s^{-1}$
q_{vs}	Specified air volume flow	$m^3 \cdot s^{-1}$
q_w	Mass flow of water inlet	$kg \cdot s^{-1}$
S	Section area	m^2
SFP_{int}	Specific Fan Power, internal	$W \cdot m^{-3} \cdot s$
u	Uncertainty range of measured data	%
U	range of uniformity of flow	
v	Velocity of air at a point	$m \cdot s^{-1}$
x	Absolute humidity	$g \cdot kg^{-1}$
$\Delta p_{s,ext}$	External static pressure difference	Pa